



New records and geographic distribution of Grey Woolly Monkeys, *Lagothrix cana* (É. Geoffroy, 1812) (Primates, Atelidae), in southern Brazilian Amazonia

André V. Nunes^{1*} and Vinicius S. Orsini²

1 Universidade Federal de Mato Grosso do Sul, Centro de Ciências Biológicas e da Saúde, Departamento de Ecologia e Conservação, Cidade Universitária, CP 549, Campo Grande, MS, Brazil

2 Pontifícia Universidade Católica de Minas Gerais, Programa de Pós-Graduação em Zoologia de Vertebrados. Departamento de Ciências Biológicas, Avenida Dom José Gaspar, CEP 30535-610, Belo Horizonte, MG, Brazil

* Corresponding author. E-mail: tataupas@gmail.com

Abstract: We report a range extension of the Grey Woolly Monkey, *Lagothrix cana*, from southwestern Amazonia, Mato Grosso, Brazil. *Lagothrix cana* was seen in a forest fragment near the “arc of deforestation”. This new record shows the need for conservation of forests in the region to protect this endangered species.

Key words: Atelidae; species distribution; southern Amazon; conservation

In the Brazilian Amazon there are 401 species of mammals and 94 of them are primates (Paglia et al. 2012). The Amazon is the Brazilian biome that has the greatest diversity and endemism of primates (Paglia et al. 2012). All five primate families occur in the Amazon, where they are represented by 15 genera, including 10 that are endemic (Paglia et al. 2012; Dalponte et al. 2014; MMA 2014; Vermeer and Tello-Alvarado 2015; IUCN 2015). Despite these impressive numbers, many of the primate species in the Amazon region are poorly known ecologically, geographically, and demographically, mainly because of difficult access (Machado et al. 2005).

Among the species lacking information are the largest primates in Latin America are those belonging to the genus *Lagothrix* (the Atelidae) and specifically the Grey Woolly Monkey, *Lagothrix cana* (É. Geoffroy, 1812) (Ruiz-García et al. 2014). The lack of scientific knowledge is evident when we see how few publications contextualise the ecology and geographical distribution of *L. cana* (Fooden 1963; Peres 1994; Wallace et al. 1996; Wallace and Painter 1999, Iwanaga and Ferrari 2002; Celino 2013).

Lagothrix cana is endemic to western Amazonia, Brazil, where it is restricted to areas south of the

Amazonas and Solimões rivers, between the Juruá, Tapajós, and Juruena rivers; the southern limits of distribution are in the state of Rondônia west of the Guaporé River and the Bolivian border (Fooden 1963; Wallace et al. 1996; Iwanaga and Ferrari 2002). Here, a range extension is reported to the Guaporé River valley, on the border between the states of Rondônia and Mato Grosso, in southwestern Amazonia. This is an ecotone region between the Amazon and Cerrado biomes.

On the morning of 28 November 2014 at approximately 09:30 h, in a forest fragment in the municipality of Comodoro (13°42'48" S, 060°21'16" W), Mato Grosso state, Brazil, we observed a group of 10 foraging individuals of *L. cana* (Figure 1) while conducting a census by line-transect survey (Buckland et al. 2010). The forest fragment has an area of about 11,500 ha and is in an



Figure 1. Individual male Gray Woolly Monkey (*Lagothrix cana*) from municipality of Comodoro, Mato Grosso, Brazil (Photo credit: André Valle Nunes).

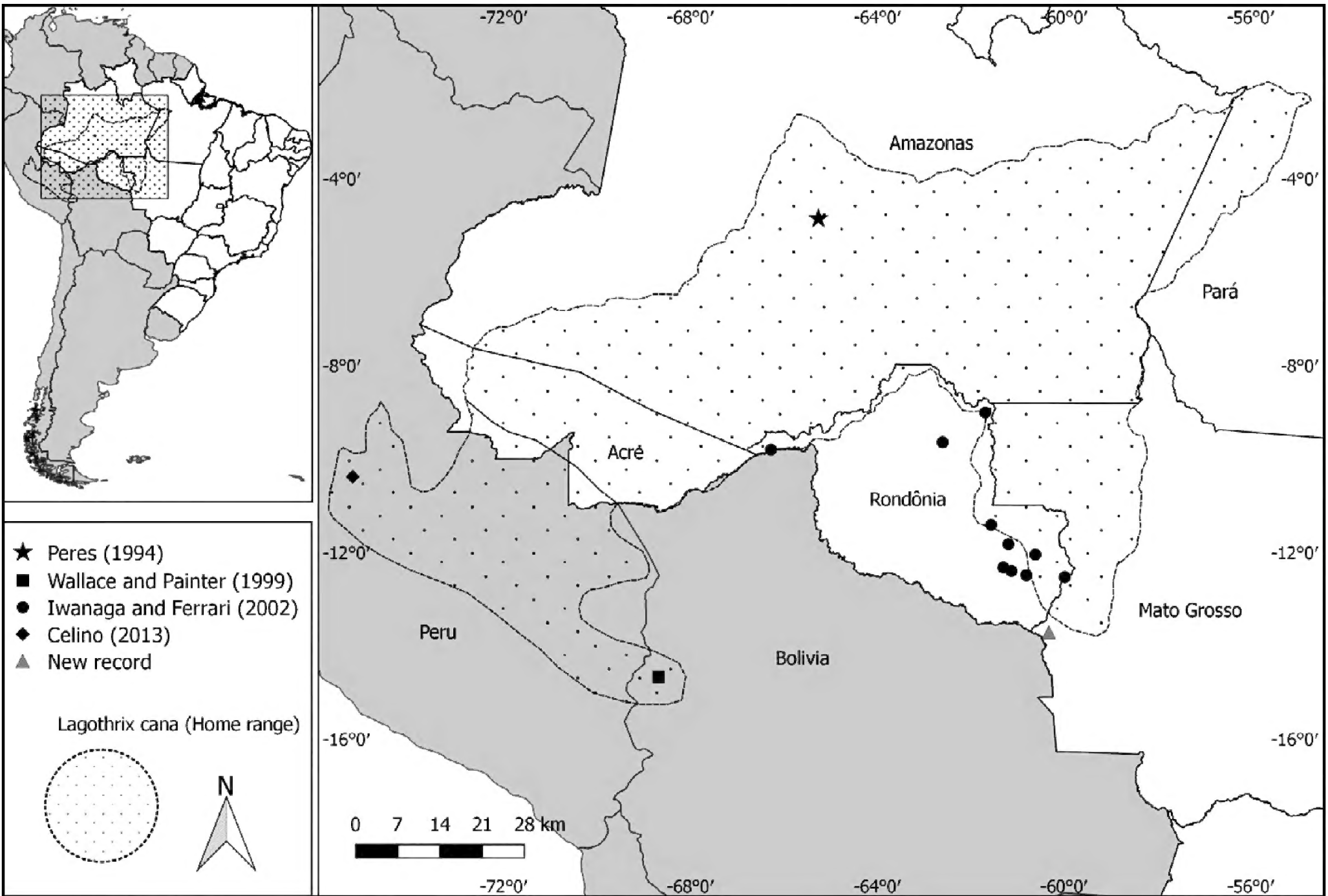


Figure 2. Geographic distribution of *Lagothrix cana*. Data as in Table 1.

Table 1. Occurrences records for *Lagothrix cana*, according to published data and the present study.

References	Location	Geographic coordinates
Presenty study	Guaporé River, Mato Grosso (red triangle)	13°42'48" S, 060°21'16" W
Peres 1994	State of Amazonas (black star)	04°50'55" S, 065°16'05" W
Wallace and Painter 1999	Madidi National Park (black square)	14°39'63" S, 068°41'49" W
Iwanaga and Ferrari 2002	State of Rondônia (black dot)	11°49'12" S, 061°11'52" W
Iwanaga and Ferrari 2002	State of Rondônia (black dot)	11°24'34" S, 061°34'06" W
Iwanaga and Ferrari 2002	State of Rondônia (black dot)	09°47'47" S, 066°17'08" W
Iwanaga and Ferrari 2002	State of Rondônia (black dot)	09°38'29" S, 062°36'25" W
Iwanaga and Ferrari 2002	State of Rondônia (black dot)	09°00'19" S, 061°41'39" W
Iwanaga and Ferrari 2002	State of Rondônia (black dot)	12°31'40" S, 059°59'29" W
Iwanaga and Ferrari 2002	State of Rondônia (black dot)	12°19'22" S, 061°18'29" W
Iwanaga and Ferrari 2002	State of Rondônia (black dot)	12°23'46" S, 061°08'04" W
Iwanaga and Ferrari 2002	State of Rondônia (black dot)	12°29'08" S, 061°08'04" W
Iwanaga and Ferrari 2002	State of Rondônia (black dot)	12°02'39" S, 060°37'21" W
Celino 2013	Yanachaga Chemillén State Park (black diamond)	10°22'34" S, 075°14'35" W

ecotone between the Amazon and Cerrado biomes. The fragment is near the region known as the “arc of deforestation” and lies 30 km from Noel Kempff Mercado National Park on the border with Bolivia in the Guaporé River valley (Figure 2).

Lagothrix cana were identified by field observations, based on their size, vocalisation and color pattern of pelage (Boubli et al. 2008) . Our identification was later confirmed by specialists based on photographic records (L. S. Moreira, com. pess.).

Our new record extends the geographic distribution of *L. cana* by about 150 km southwest of the southern limit of othe species’ range as proposed by Iwanaga and Ferrari (2002), and 40 km southeast of that proposed by Boubli et al. (2008). Iwanaga and Ferrari (2002) predicted that the distribution of this species in Rondônia state might be limited to the San Pedro River and west of the Pimenta Bueno River due to a combination of geographic and ecological factors that include habitat quality, a heterogeneous landscape of

mountains, plains, and savannahs, and competition with other large primates. Two examples of large, possibly competing primates are *Alouatta puruensis* (Lönnerberg 1941) and *Chiropotes albinasus* (I. Geoffroy & Deville, 1848), but we found that these two species coexist with *L. cana*.

This report contributes directly to the geographical knowledge of *L. cana*, which has been assessed as Endangered by Brazil and the International Union for the Conservation of Nature (MMA 2014; IUCN 2015). This species is intolerant of habitat disturbances and suffers intense hunting pressure, including on Indigenous Lands (Peres 1990, 2001; Defler and Stevenson 2014). Furthermore, because *L. cana* has a long generation time, anthropogenic threats especially impede population growth in areas with constant human pressures (Levi and Peres 2013).

Our discovery of *L. cana* in the Guaporé River valley highlights the regional importance of southwestern Amazonia for the conservation of primates. This ecotone region, between the Amazon and Cerrado biomes, is near the “arc of deforestation”, which extends across five states from parts of Rondônia, Mato Grosso, Pará, Tocantins, and Maranhão (Ferreira et al. 2005). Deforestation rates in this area are the highest in all of the Brazilian Amazon (Metzger 2001; Michalski et al. 2008). Thus, efforts to conserve populations of *L. cana* are essential, not only for the intrinsic value of the species itself, but also for the preservation of whole ecosystem.

ACKNOWLEDGEMENTS

This study was made possible by the logistical support of Bioceiv Smart Projects Group and Interligação Elétrica do Madeira S.A. A fellowship to AVN was provided by CAPES (Coordenação de Aperfeiçoamento de Pessoal de Nível Superior). We thank Paulo Marcos Penna Orsini for reviewing the English. Two anonymous referees provided useful suggestions and insights.

LITERATURE CITED

- Boubli, J.P., A. Di Fiore, A.B. Rylands and R.B. Wallace. 2008. *Lagothrix cana*. The IUCN Red List of threatened species. Accessed on 22 December 2015. doi: 10.2305/IUCN.UK.2008.RLTS.T39962A10280912.en
- Buckland, S.T., A.J. Plumptre, L. Thomas and E.A. Rexstad. 2010. Design and analysis of line transect surveys for primates. *International Journal Primatology* 31(5): 833–847. doi: 10.1007/s10764-010-9431-5
- Celino, D.V.L. 2013. Variación mensual del uso del territorio por el mono choro *Lagothrix Cana* en el Parque Nacional Yanachaga Chemillén, Perú. *Neotropical Primates* 20(1): 44–48. doi: 10.1896/044.020.0107
- Dalponete, J.C., F.E. Silva and J.S.S. Júnior. 2014. New species of titi monkey, genus *Callicebus* Thomas, 1903 (Primates, Pitheciidae) from southern Amazonia, Brazil. *Papéis Avulsos de Zoologia* 54(32): 457–472. doi: 10.1590/0031-1049.2014.54.32
- Defler, T. and P.R. Stevenson (eds.). 2014. The woolly monkey: behavior, ecology, systematics, and captive research. *Developments in Primatology* 39. New York: Springer. 320 pp. doi: 10.1007/978-1-4939-0697-0
- Ferreira, L.V., E.M. Venticinque and S. Almeida. 2005. O desmatamento na Amazônia e a importância das áreas protegidas. *Estudos Avançados, Brasil*. 19(53): 157–166. doi: 10.1590/S0103-40142005000100010
- Fooden, J. 1963. A revision of the woolly monkeys (genus *Lagothrix*). *Journal of Mammalogy* 44(2): 213–247. doi: 10.2307/1377454
- Iwanaga, S. and S.F. Ferrari. 2002. Geographic distribution and abundance of woolly (*Lagothrix cana*) and spider (*Ateles chamek*) monkeys in southwestern Brazilian Amazonia. *American Journal of Primatology* 56(1): 57–64. doi: 10.1590/0031-1049.2014.54.32
- IUCN (International Union for the Conservation of Nature). 2015. The IUCN Red List of threatened species. Accessed at <http://www.iucnredlist.org>, 19 November 2015.
- Levi, T. and C.A. Peres. 2013. Dispersal vacuum in the seedling recruitment of a primate-dispersed Amazonian tree. *Biological Conservation* 163: 99–106. doi: 10.1016/j.biocon.2013.03.016
- Machado, A.B.M., C.S. Martins and G.M. Drummond. 2005. Lista da fauna brasileira ameaçada de extinção: incluindo as espécies quase ameaçadas e deficientes em dados. Belo Horizonte: Fundação Biodiversitas 160 pp.
- Metzger, J.P. 2001. Effects of deforestation pattern and private nature reserves on the forest conservation in settlement areas of the Brazilian Amazon. *Biota Neotropica* 1(1/2): 1–14. doi: 10.1590/S1676-06032001000100003
- Michalski, F., C.A. Peres and I.R. Lake. 2008. Deforestation dynamics in a fragmented region of southern Amazonia: evaluation and future scenarios. *Environmental Conservation* 35(2): 93–103. doi: 10.1017/S0376892908004864
- MMA (Ministério do Meio Ambiente) 2014. Portaria nº 444, de 17 de dezembro de 2014. Lista Nacional Oficial de Espécies da Fauna Ameaçadas de Extinção. <http://pesquisa.in.gov.br/imprensa/jsp/visualiza/index.jsp?jornal=1&pagina=121&data=18/12/2014>
- Paglia, A.P., G.A.B. Fonseca, A.B. Rylands, G. Herrmann, L.M.S. Aguiar, A.G. Chiarello, Y.L.R. Leite, L.P. Costa, S. Siciliano, M.C.M. Kierulff, S.L. Mendes, V.C. Tavares, R.A. Mittermeier and J.L. Patton. 2012. Lista anotada dos mamíferos do Brasil / Annotated checklist of Brazilian mammals. 2nd edition. Occasional Papers in Conservation Biology 6. Arlington: Conservation International. 76 pp. http://www.conservation.org/global/brasil/publicacoes/Documents/annotated_checklist_of_brazilian_mammals_2nd_edition.pdf
- Peres, C.A. 1990. Effects of hunting on western Amazonian primate communities. *Biological Conservation* 54(1): 46–59. doi: 10.1016/0006-3207(90)90041-M
- Peres, C.A. 1994. Primate responses to phonological changes in an Amazonian terra firme forest. *Biotropica* 26(1): 98–112. doi: <http://www.jstor.org/stable/2389114>
- Peres, C.A. 2001. Synergistic effects of subsistence hunting and habitat fragmentation on Amazonian forest vertebrates. *Conservation Biology* 15(6): 1490–1505. doi: 10.1046/j.1523-1739.2001.01089.x
- Ruiz-García, M., M. Pinedo-Castro and J.M. Shostell. 2014. How many genera and species of woolly monkeys (Atelidae, Platyrrhine, Primates) are there? The first molecular analysis of *Lagothrix flavicauda*, an endemic Peruvian primate species. *Molecular Phylogenetics and Evolution* 79: 179–198. doi: 10.1016/j.ympev.2014.05.034
- Vermeer, J. and J.C. Tello-Alvarado. 2015. The distribution and taxonomy of titi monkeys (*Callicebus*) in central and southern

- Peru, with the description of a new species. *Primate Conservation* 29: 1–21. doi: 10.1896/052.029.0102
- Wallace, R.B, R.L.E. Painter, A.B. Taber and J.M. Ayres. 1996. Notes on a distributional river boundary and southern range extension for two species of Amazonian primate. *Neotropical Primates* 8(1): 24–28.
- Wallace, R.B. and R.L.E. Painter. 1999. A new primate record for Bolivia from an apparently isolated population of common woolly monkeys representing a southern range extension for the *Lagothrix* genus. *Neotropical Primates* 7(4): 111–112.

Author contributions: AVN and VSO equally collected the data and wrote the text.

Received: 1 June 2016

Accepted: 8 October 2016

Academic editor: Guilherme S. T. Garbino